NUMBER® CORNER

SECOND EDITION

TEACHERS GUIDE

NOVEMBER

GRADE 3

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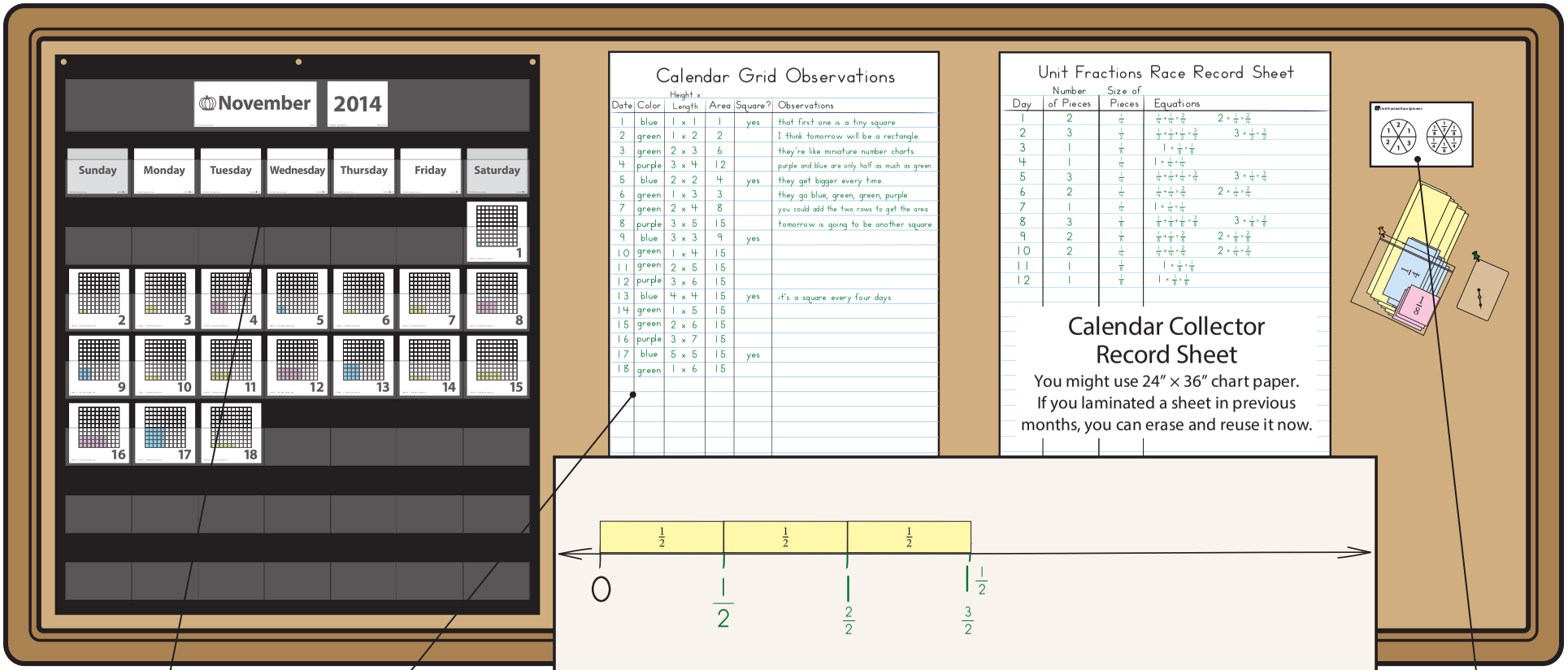
Number Corner November

November Sample Display

Of the items shown below, some are ready-made and included in your kit; you'll prepare others from classroom materials and the included teacher masters. Refer to the Preparation section in each workout for details about preparing the items shown. The display layout shown fits on a 10′ × 4′ bulletin board or on two 6′ × 4′ bulletin boards, with some extra room needed for the Unit Fraction Race display. Other configurations can be used according to classroom needs. If you have extra space to work with, a Number Corner header may be made from bulletin board letters, student-drawn letters, or other materials.



Calendar Grid Pocket Chart

Remember to consult a calendar for the starting day for this month and year.

Calendar Grid Observations Chart

You might use 24″ × 36″ chart paper. If you laminated a sheet in previous months, you can erase and reuse it now.

Unit Fraction Race Display

You'll need a place to hang a sheet of butcher paper about 5 feet wide. You might be able to hang it from the bottom of your Number Corner display. The class will update this display during Calendar Collector activities.

Unit Fraction Race Spinners & Fraction Pieces

These items are made from copies of teacher masters. Store them, along with a clear spinner overlay, where they'll be handy during Number Corner time.

☑ November Daily Planner

Day	Date	Calendar Grid	Calendar Collector	Computational Fluency	Number Line	Solving Problems
1			**Activity 1** Introducing the Unit Fraction Race (p. 15)			
2		**Activity 1** Introducing the Calendar Grid (p. 9)	*Update*			
3		*Update*	*Update*			**Activity 1** Introducing Equations with Variables (p. 34)
4		*Update*	*Update*		**Activity 1** Rounding to the Nearest Ten (p. 28)	
5		*Update*	*Update*			
6		*Update*	**Activity 2** Labeling the Number LIne & Making Predictions (p. 17)			
7		*Update*	*Update*			**Activity 2** Solving Problems with Equations (p. 36)
8		*Update*	*Update*		**Activity 2** Playing Round & Add as a Class (p. 30)	
9		*Update*	*Update*			**Activity 3** Discussing Problems with Equations (p. 38)
10		**Activity 2** Exploring Patterns & Using the Area Model (p. 10)	*Update*			
11		*Update*	*Update*	**Activity 1** Introducing Array Race (p. 22)		
12		*Update*	**Activity 3** Working with Equivalent Fractions & Number Lines (p. 18)			
13		*Update*	*Update*		**Activity 3** Playing Round & Add in Pairs (p. 32)	
14		**Activity 3** Reviewing Multiplication Concepts & Arrays (p. 12)	*Update*			
15		*Update*	*Update*	**Activity 2** Playing Array Race (p. 24)		

Note *On days when the Calendar Grid or Calendar Collector are not featured in an activity, a student helper will update one or both either before or after Number Corner. Summaries of the update routines appear below.*

Calendar Grid – The student helper posts one or more calendar markers so that the Calendar Grid is complete up to the current date. After the record sheet is posted, the student will update the chart as well.
Calendar Collector – The student helper spins the spinners, records the spins on the record sheet, glues the appropriate number of fraction pieces to one of the three number lines, and marks that number line.

Number Corner
November

Overview

Both the Calendar Grid and Computational Fluency workouts focus on multiplication. Students explore area and arrays as they look for patterns and relationships on the Calendar Grid markers and play a game called Array Race in the Computational Fluency workout. Students learn about and practice rounding with a game on the Number Line and they begin exploring fractions as they collect halves, fourths, and eighths in the Calendar Collector's Unit Fraction Race. The Problem Strings workout switches from string work to problem solving this month, as students work on strategies and skills including writing equations with letters standing for unknown quantities.

Activities

Workouts	Day	Activities	D	G	SB
Calendar Grid Multiplication Arrays Students add a new Rectangular Array marker to the Calendar Grid for each day this month. They find the dimensions and area of each array, share observations about the emerging patterns, and make predictions about future markers. This exploration of arrays will prepare students to work with the area model of multiplication. Later in this workout, students will use hundreds number charts to decompose the area products into smaller known arrays and products.	2	**1** Introducing the Calendar Grid	●		
	10	**2** Exploring Patterns & the Area Model	●		
	14	**3** Reviewing Multiplication Concepts & Arrays	●		●
Calendar Collector Unit Fraction Race For each school day this month, students spin two spinners: one shows what size unit fraction to collect that day (½, ¼, or ⅛) and the other shows how many of that unit fraction to collect that day. Each kind of fraction is added to its own growing number line: halves on one, fourths on another, and eighths on another. As each collection grows, students compare them and in so doing, develop deeper understandings about fractions.	1	**1** Introducing the Unit Fraction Race	●		
	6	**2** Labeling the Number Lines & Making Predictions	●		
	12	**3** Working with Equivalent Fractions & Number Lines	●		●
Computational Fluency Array Race Students play a game in which they roll a 1–6 die and a 4–9 die and multiply the results. They frame and shade in the results on a 10–by–10 grid. Students also write an equation for each turn. After 3 rounds, they find the sum of the products. Students first play the game as a class and then with a partner. Alternate versions can be explored for differentiation.	11	**1** Introducing Array Race	●	●	
	15	**2** Playing Array Race	●	●	●
Number Line Rounding to the Nearest Ten This month students demonstrate their understanding of 2-digit numbers in our base ten system, rounding to the closest ten and thinking about the order of numbers from 0 to 100. The teacher introduces the idea of using an open number line as a tool to explore rounding numbers to the nearest ten.	4	**1** Rounding to the Nearest Ten	●		
	8	**2** Playing Round & Add as a Class	●	●	
	13	**3** Playing Round & Add in Pairs	●	●	●
Solving Problems One-Step Story Problems with Equations Instead of working with problem strings this month, students solve story problems and write equations to represent the problems. They are introduced to a process of discussing and solving problems and then sharing and discussing their work, which will be repeated throughout the year. This month, students not only solve story problems but also work on writing equations with a variable standing for an unknown quantity.	3	**1** Introducing Equations with Variables	●		
	7	**2** Solving Problems with Equations	●		●
	9	**3** Discussing Problems with Equations	●		●

D – Discussion, **G** – Game, **SB** – Number Corner Student Book

Teaching Tips

November is a short month that can fly by. Don't worry if you do not get through all of the activities this month. Conversely, if you have extra time, feel free to have students play extra rounds of the Computational Fluency and Number Line games, or spend more time making observations about the Calendar Grid and Calendar Collector.

This month, Calendar Collector gets students thinking about fractions, which they will explore in greater depth later in the year. Don't worry if students don't seem to "get" fractions right away. Take notes on students and use these notes to help differentiate instruction when you get to later workouts that address fractions.

Use the Number Corner 2 Checkup results to help guide your instruction. Was there an area where many students seem confused? Is there a time and place during Number Corner where you can review or practice those skills and concepts? Again, don't worry too much as all skills and concepts will be revisited throughout the year.

Practice setting and keeping a good pace. Think about when a conversation can carry on (when most students are engaged, making breakthroughs in their thinking, asking good questions, etc.) or when it needs to be cut off so you can move to the next thing or present something in a different way (many students are losing focus, seem confused, or students "get it" so you know you can move on).

Target Skills

The table below shows the major skills and concepts addressed this month. It is meant to provide a quick snapshot of the expectations for students' learning during this month of Number Corner.

Major Skills/Concepts Addressed	CG	CC	CF	NL	SP
3.OA.1 Interpret products of whole numbers			●		
3.OA.3 Solve multiplication story problems with products to 100 involving situations of equal groups or arrays					●
3.OA.4 Solve for the unknown in a multiplication equation involving 3 whole numbers (a multiplicand, multiplier, and product)					●
3.OA.5 Multiply using the distributive, associative, and commutative properties	●		●		
3.OA.7 Recall from memory products of two 1-digit numbers	●				
3.OA.7 Fluently multiply with products to 100 using strategies	●		●		
3.NBT.1 Round whole numbers to the nearest ten				●	
3.NBT.2 Fluently add and subtract with sums to 1,000					●
3.NBT.2 Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to add fluently with sums to 1,000 and subtract fluently with minuends to 1,000				●	●
3.NF.1 Demonstrate an understanding of a unit fraction 1/*b* as 1 of *b* equal parts into which a whole has been partitioned (e.g., ¼ is 1 of 4 equal parts of a whole)		●			
3.NF.1 Demonstrate an understanding of a fraction *a*/*b* as a equal parts, each of which is 1/*b* of a whole (e.g., ¾ is 3 of 4 equal parts of a whole or 3 parts that are each ¼ of a whole)		●			
3.NF.2b Show a fraction *a*/*b* on a number line by marking off, starting at 0, a lengths of 1/*b* each and labeling the resulting interval *a*/*b*		●			
3.NF.3c Write a whole number as a fraction		●			
3.NF.3c Recognize fractions that are equivalent to whole numbers		●			
3.MD.7a Demonstrate that the area of a rectangle with whole-number side lengths can be found by multiplying the side lengths	●				
3.MD.7b Find the area of a rectangle by multiplying its side lengths	●				
3.MD.7b Represent the product of two numbers as the area of a rectangle with side lengths equal to those two numbers	●				
3.MD.7c Use the area model for multiplication to illustrate the distributive property (e.g., the area of a rectangle with side lengths *a* and $b + c$ is equal to $a \times (b + c)$ or $a \times b + a \times c$)	●				

Major Skills/Concepts Addressed	CG	CC	CF	NL	SP
3.MD.7d Find the area of a figure that can be decomposed into non-overlapping rectangles	●				
3.MP.1 Make sense of problems and persevere in solving them					●
3.MP.2 Reason abstractly and quantitatively	●				
3.MP.3 Construct viable arguments and critique the reasoning of others					●
3.MP.4 Model with mathematics			●	●	●
3.MP.5 Use appropriate tools strategically			●		●
3.MP.6 Attend to precision		●	●		
3.MP.7 Look for and make use of structure	●	●		●	
3.MP.8 Look for and express regularity in repeated reasoning	●				

CG – Calendar Grid, **CC** – Calendar Collector, **CF** – Computational Fluency, **NL** – Number Line, **SP** – Solving Problems

Materials Preparation

Each workout includes a list of required materials by activity. You can use the table below to prepare materials ahead of time for the entire month.

Materials		Done
Copies	Run copies of Teacher Masters T1–T9 according to the instructions at the top of each master.	
	If students do not have their own Number Corner Student Books, run a class set of pages 11–17.	
	Run a single display copy of Number Corner Student Book pages 11–17.	
Chart Preparation	Prepare the Observations Chart according to Preparation instructions in the Calendar Grid workout.	
	Use butcher paper to create a number line chart according to preparation instructions in the Calendar Collector workout.	
	Prepare this month's version of the record sheet according to preparation instructions in the Calendar Collector workout.	
Paper Cutting	Make copies of the Small Number Charts Teacher Master; cut and store them according to preparation instructions in the Calendar Grid workout.	
	Run copies of the fraction pieces teacher masters on colored paper; cut and store pieces according to preparation directions in the Calendar Collector workout.	

November Calendar Grid

Multiplication Arrays

Overview

Students add a new Rectangular Array marker to the Calendar Grid for each day this month. They find the dimensions and area of each array, share observations about the emerging patterns, and make predictions about future markers. As the featured arrays get larger later in the month, students decompose them into smaller arrays (partial products) to compute the total product. This exploration of arrays familiarizes students with the area model for multiplication and gives them the opportunity to analyze multiplication strategies that will help them develop fluency with basic multiplication facts and calculate the products of multi-digit numbers.

Skills & Concepts

- Multiply using the distributive, associative, and commutative property (3.OA.5)
- Fluently multiply with products to 100 using strategies (3.OA.7)
- Recall from memory products of two 1-digit numbers (3.OA.7)
- Demonstrate that the area of a rectangle with whole-number side lengths can be found by multiplying the side lengths (3.MD.7a)
- Use the area model for multiplication to illustrate the distributive property (e.g., the area of a rectangle with side lengths a and $b + c$ is equal to $a \times (b + c)$ or $a \times b + a \times c$) (3.MD.7c)
- Reason abstractly and quantitatively (3.MP.2)
- Look for and make use of structure (3.MP.7)
- Look for and express regularity in repeated reasoning (3.MP.8)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Introducing the Calendar Grid	2		Used in all Calendar Grid activities this month: • Calendar Grid pocket chart • Day, Month, and Year markers • Rectangular Array calendar markers	• Calendar Grid Observations Chart (see Preparation) • erasable markers
Activity 2 Exploring Patterns & the Area Model	10	**TM T1** Small Number Charts	• Word Resource Cards for *area, array, dimension, factor,* and *product*	
Activity 3 Reviewing Multiplication Concepts & Arrays	14	**TM T1** Small Number Charts (for challenge suggestion) **NCSB 11*** Rectangular Arrays		

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master.

** Run 1 copy of this page for display.*

Vocabulary

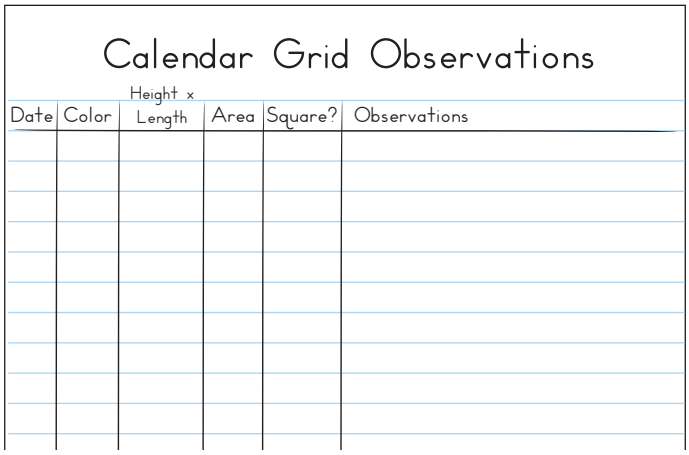
An asterisk [*] identifies those terms for which Word Resource Cards are available.

area*
array*
dimension*
divide*
division
factor*
formula
height
length
multiplication
multiply*
product*
width

Preparation

Calendar Grid Observations Chart

Erase the Calendar Grid Observations Chart from last month. Create six columns and label the top of the first sheet as shown below for use with this month's markers. The chart may be extended midway through the month using the second sheet of laminated chart paper. Use an erasable marker to record students' observations so that you can reuse the chart each month.

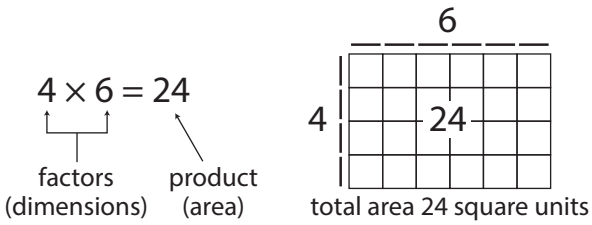


Small Number Charts

Make copies of the Small Number Charts Teacher Master, and cut them into quarters so that each student gets a piece with two grids on it. Store them next to your Number Corner area for use during Activities 2 and 3.

Mathematical Background

The calendar markers this month feature rectangular arrays that promote use of the area model to explore multiplication strategies in depth. You might recall that in the area model for multiplication, the factors are represented as the dimensions of an array, and that the product of the two factors is represented by the area of the array.



The area model helps students develop strategies for multiplying that make use of the distributive and associative properties. Later this month, students will decompose larger arrays into smaller, familiar arrays, which they can use to find the total product. For example, students might solve 4 × 6 by breaking the array shown above into two 2-by-6 arrays. Many students will quickly recall that 2 × 6 = 12. They can quickly double 12 to arrive at the total product of 24. This strategy can be expressed in the form of an equation that illustrates the distributive property or the associative property.

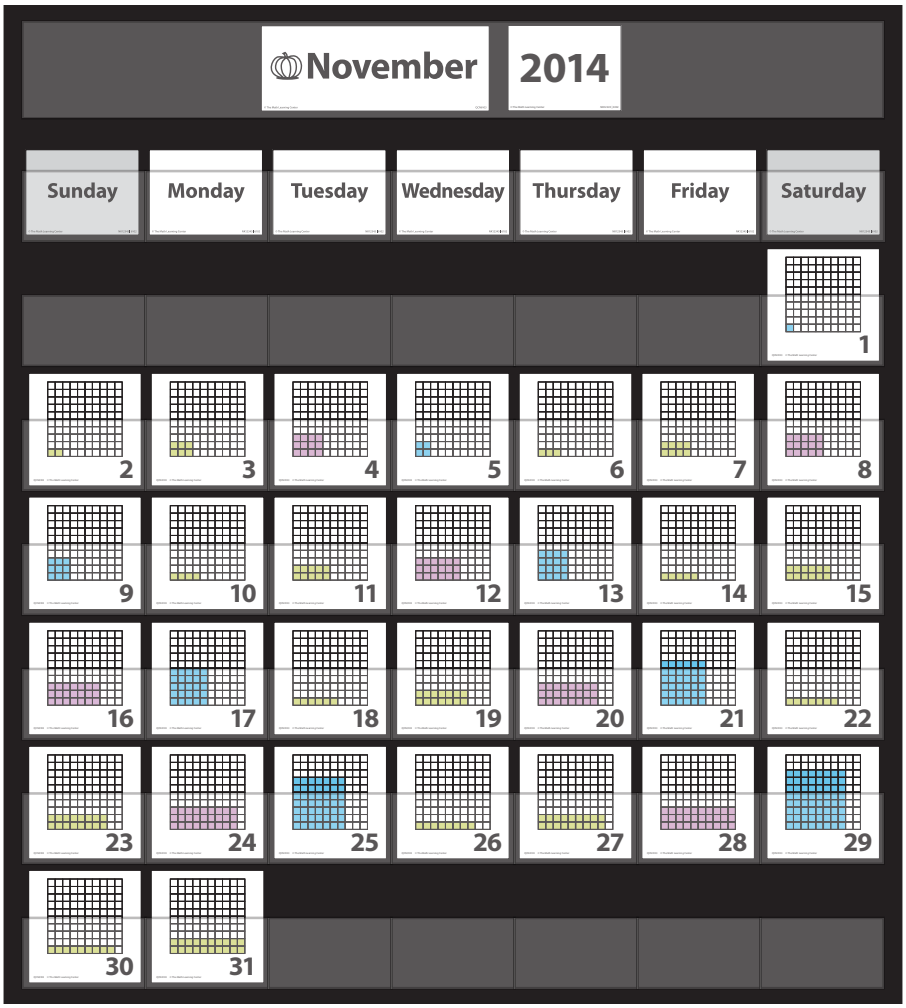
$4 \times 6 = (2 + 2) \times 6 = (2 \times 6) + (2 \times 6) = 12 + 12 = 24$
Distributive Property

$4 \times 6 = (2 \times 2) \times 6 = 2 \times (2 \times 6) = 2 \times 12 = 24$
Associative Property

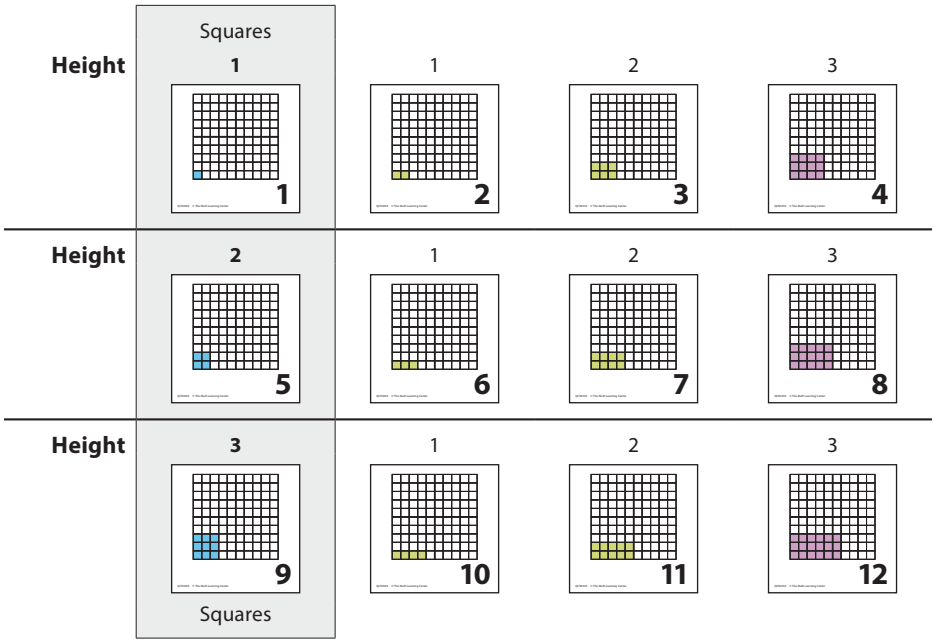
About the Pattern

Your students may notice a repeating color sequence, reoccurring square arrays, repeating heights, and growing widths. They may discover that the growing widths result in growing area patterns. This month's markers form a complex sequence, rich in possibilities for mathematical observations and insights. To help students track the various patterns, use the Calendar Grid Observations Chart to record the information about each marker.

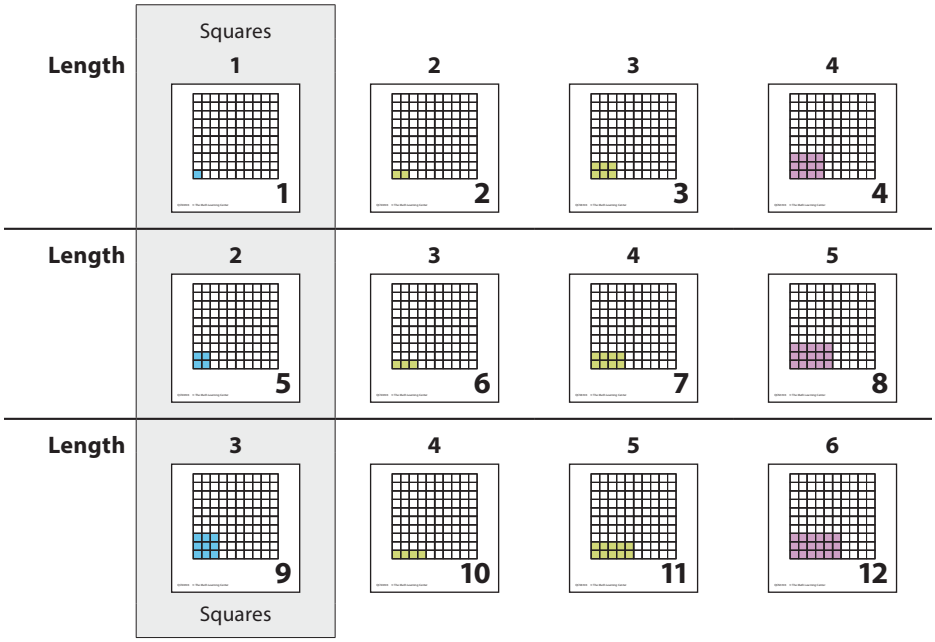
Several of the patterns featured in this month's calendar markers are explained below for your benefit. We encourage you not to give hints, so that students have the chance to discover the pattern on their own.



1. Color: blue, green, green, purple; blue, green, green, purple; and so on.
2. Shape: Day one is a square and every fourth array is a square. The three arrays between each square are all rectangles, creating a repeating pattern of square, rectangle, rectangle, rectangle.
3. Array Height: The height of each square is 1 unit greater than the height of the previous square. Thus, the height of the array on day 1 is 1. On day 5 the height is 2. On day 9, it's 3, and so forth. In the three days between each square, the heights fall into a repetitive pattern of 1, 2, 3 as shown in the chart below.



4. Array Length: Notice that the lengths of the markers start at 1 on day 1 and increase by 1 each day until the fifth day. On the fifth day, the length falls back to 2 and increases by 1 each day until it falls back to 3 on the ninth day. After the ninth day, the length increases by 1 until the twelfth day, and so forth.



Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

November

Date	Color	Height × Length	Area	Square?	Observations
1	blue	1 × 1	1	yes	Add observations from students.
2	green	1 × 2	2	no	
3	green	2 × 3	6	no	
4	purple	3 × 4	12	no	
5	blue	2 × 2	4	yes	
6	green	1 × 3	3	no	
7	green	2 × 4	8	no	
8	purple	3 × 5	15	no	
9	blue	3 × 3	9	yes	
10	green	1 × 4	4	no	
11	green	2 × 5	10	no	
12	purple	3 × 6	18	no	
13	blue	4 × 4	16	yes	
14	green	1 × 5	5	no	
15	green	2 × 6	12	no	
16	purple	3 × 7	21	no	
17	blue	5 × 5	25	yes	
18	green	1 × 6	6	no	
19	green	2 × 7	14	no	
20	purple	3 × 8	24	no	
21	blue	6 × 6	36	yes	
22	green	1 × 7	7	no	
23	green	2 × 8	16	no	
24	purple	3 × 9	27	no	
25	blue	7 × 7	49	yes	
26	green	1 × 8	8	no	
27	green	2 × 9	18	no	
28	purple	3 × 10	30	no	
29	blue	8 × 8	64	yes	
30	green	1 × 9	9	no	
31	green	2 × 10	20	no	

About the Pattern

Your students may notice a repeating color sequence, reoccurring square arrays, repeating heights, and growing widths. They may discover that the growing widths result in growing area patterns. This month's markers form a complex sequence, rich in possibilities for mathematical observations and insights. To help students track the various patterns, use the Calendar Grid Observations Chart to record the information about each marker.

Several of the patterns featured in this month's calendar markers are explained below for your benefit. We encourage you not to give hints, so that students have the chance to discover the pattern on their own.

1. Color: blue, green, green, purple; blue, green, green, purple; and so on.
2. Shape: Day one is a square and every fourth array is a square. The three arrays between each square are all rectangles, creating a repeating pattern of square, rectangle, rectangle, rectangle.
3. Array Height: The height of each square is 1 unit greater than the height of the previous square. Thus, the height of the array on day 1 is 1. On day 5 the height is 2. On day 9, it's 3, and so forth. In the three days between each square, the heights fall into a repetitive pattern of 1, 2, 3 as shown in the chart below in your Teachers Guide.

Notes:

CALENDAR GRID OBSERVATIONS

DATE	COLOR	HEIGHT x LENGTH	AREA	SQUARE?	OBSERVATIONS

November Calendar Collector

Unit Fraction Race

Overview

For each school day this month, students spin two spinners: one shows what size unit fraction to collect that day (½, ¼, or ⅛) and the other shows how many of that unit fraction to collect that day. Each kind of fraction is added to its own growing number line: halves on one, fourths on another, and eighths on another. As each collection grows, students compare them and in so doing, develop deeper understandings about fractions.

Skills & Concepts

- Demonstrate an understanding of a unit fraction $\frac{1}{b}$ as 1 of *b* equal parts into which a whole has been partitioned (e.g., ¼ is 1 of 4 equal parts of a whole) (3.NF.1)
- Demonstrate an understanding of a fraction $\frac{a}{b}$ as a equal parts, each of which is $\frac{1}{b}$ of a whole (e.g., ¾ is 3 of 4 equal parts of a whole or 3 parts that are each ¼ of a whole) (3.NF.1)
- Show a fraction $\frac{a}{b}$ on a number line by marking off, starting at 0, a lengths of $\frac{1}{b}$ each and labeling the resulting interval $\frac{a}{b}$ (3.NF.2b)
- Write a whole number as a fraction (3.NF.3c)
- Recognize fractions that are equivalent to whole numbers (3.NF.3c)
- Attend to precision (3.MP.6)
- Look for and make use of structure (3.MP.7)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Introducing the Unit Fraction Race	1	**TM T2–T4** One-Half, One-Fourth, and One-Eighth Pieces **TM T5** Unit Fraction Race Spinners	• spinner overlay • Word Resource Cards for *mixed number* and *improper fraction*	For all Calendar Collector activities this month: • three envelopes or plastic bags • glue stick • butcher paper (see Preparation) • Unit Fractions Race Record Sheet (see Preparation) • erasable markers
Activity 2 Labeling the Number Lines & Making Predictions	6			
Activity 3 Working with Equivalent Fractions & Number Lines	12	**TM T2–T4** One-Half, One-Fourth, and One-Eighth Pieces **NCSB 12*** Fractions on a Number Line		• yardstick for lining up fractions shown on different number lines

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master.

** Run 1 copy of this page for display.*

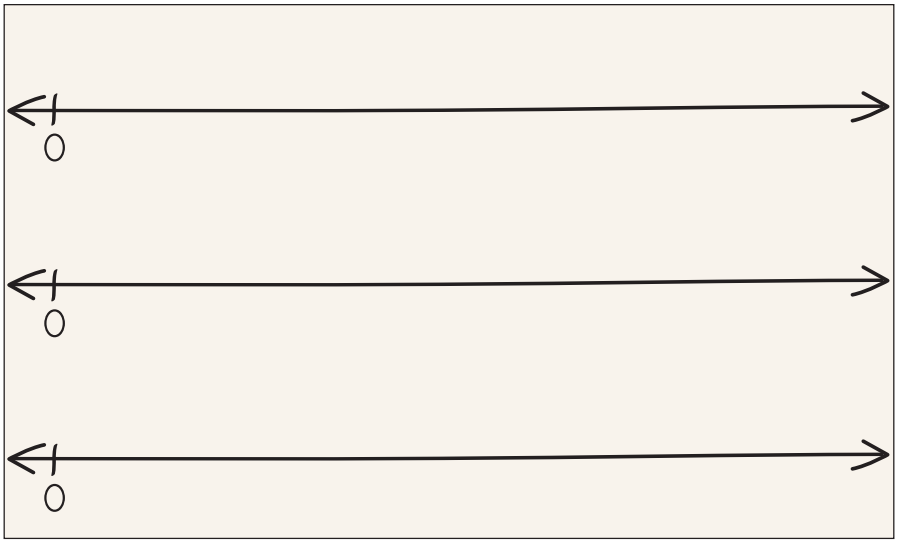
Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

denominator*
equation*
equivalent fractions*
fraction*
improper fraction*
mixed number*
numerator*
unit fraction

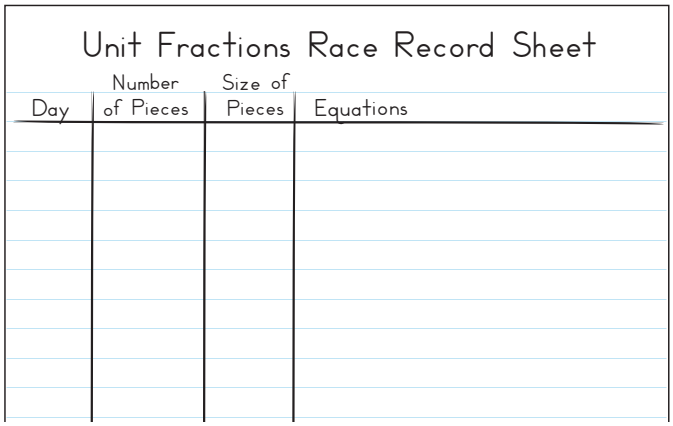
Preparation

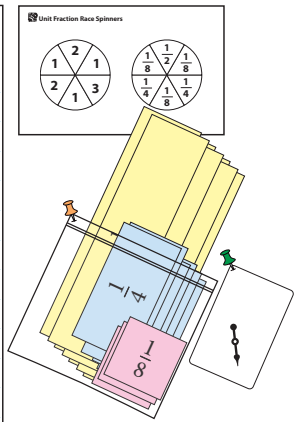
In your Number Corner area, post a piece of butcher that is about 5 feet long. Draw three open number lines on it as shown here.



Run copies of the One-Half, One-Fourth, and One-Eighth Fraction Pieces Teacher Masters on colored paper according to the directions at the top of each master. Cut the pieces apart and store each set of pieces separately in an envelope or plastic bag, posted next to the butcher paper. Run more copies of the necessary pages if you run out of any kind of piece before the end of the month. Also post the Unit Fraction Race Spinners and the clear spinner overlay close to them.

Use your laminated sheet from last month to create a new Calendar Collector Record Sheet for this month. Use an erasable marker and yardstick to draw and label four columns as shown.





Mathematical Background

This month's Calendar Collector helps students see that any fraction ($\frac{a}{b}$) is composed of some number (a) of a particular unit fraction ($\frac{1}{b}$). For example, $\frac{3}{4}$ is equal to 3 one-fourths. We can use the equation $\frac{3}{4} = 3 \times \frac{1}{4}$ to express this idea symbolically; we can use the equation $\frac{a}{b} = a \times \frac{1}{b}$ to express this idea in more general terms as well. You won't be inviting students to use variables to express this idea. Instead, students will collect different numbers of unit fractions each day to build three different number lines: one marked in halves, one marked in fourths, and one marked in eighths. They mark the number lines using fractions (including improper fractions) and mixed numbers. In so doing, they see how each fraction and whole number is composed of some number of unit fractions. They also compare the unit fractions and the different number lines to explore equivalent fractions. By building fractions from unit fractions and by comparing the three number lines, students will begin to arrive at the generalization expressed by the mathematical statement $\frac{a}{b} = a \times \frac{1}{b}$.

Key Questions

Use these questions to help guide students' discussion this month.

- How many halves (fourths, eighths) are there in 1 (2, 3)?
- What is another way to write this fraction?
- How much farther until we get to 2 (or some other whole number) on this number line?
- How many eighths (or fourths) are in ½ (or ¼)?

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

UNIT FRACTIONS RACE

RECORD SHEET

DAY	NUMBER OF PIECES	SIZE OF PIECES	EQUATIONS

November Computational Fluency

Array Race

Overview

Students play a game in which they roll a 1–6 die and a 4–9 die and multiply the results. They frame and shade in the resulting array on a 10–by–10 grid and write an equation showing the factors and the product for each turn. After three rounds, they find the sum of the products. Students first play the game as a class and then with a partner. Students can play the game with some adaptations for differentiation.

Skills & Concepts

- Interpret products of whole numbers (3.OA.1)
- Multiply using the distributive property (3.OA.5)
- Fluently multiply with products to 100 using strategies (3.OA.7)
- Model with mathematics (3.MP.4)
- Use appropriate tools strategically (3.MP.5)
- Attend to precision (3.MP.6)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Introducing Array Race	11	**TM T6** Introducing Array Race	• 1–6 die • 4–9 die	• colored pencils in two different colors
Activity 2 Playing Array Race	15	**NCSB 13–14** Array Race	• 1–6 dice, half-class set • 4–9 dice, half-class set	• colored pencils, half-class set of 2 different colors

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master.

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

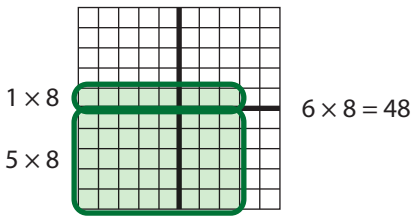
array*
equation*
factor*
product*
sum or total*

Preparation

In Activity 2, students play Array Race with partners. You may want to pre-assign partners for students to get the most out of the game.

Mathematical Background

Array Race builds on the September Computational Fluency game Loops & Groups and also complements the work students are doing with arrays in the Calendar Grid workout this month. In Array Race, students multiply larger numbers and show those numbers and their products using an array. This movement from pictures to arrays marks a development in thinking about multiplication models. The array in Array Race is a closed array, meaning that students see each unit represented by a square (the 10–by–10 grid used in the game shows 100 squares). This model provides many points of entry for determining products: from one–to–one counting to repeated addition (adding the number in each row or column repeatedly) to looking at smaller arrays within a larger array (partial products). The structure of the 10–by–10 grid also helps students think about finding products more efficiently, because 5–by–5 arrays are marked within the 10–by–10 structure. Because students tend to be comfortable multiplying by 5, they can often use what they know about the 5s facts to find the products for larger numbers, as shown in the example below.



November Number Line

Rounding to the Nearest Ten

Overview

Students mark a number line in multiples of 10 from 0 to 100 and use it as a model for rounding two-digit numbers to the nearest ten. Then they use a number line marked in the same way to play a game in which players claim multiples of 10 by rounding different numbers to the nearest ten. At the end of the game, players use the rounded numbers to estimate each player's score and then add their numbers; the player with the higher sum wins.

Skills & Concepts

- Round whole numbers to the nearest ten (3.NBT.1)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to add fluently with sums to 1,000 (3.NBT.2)
- Model with mathematics (3.MP. 4)
- Look for and make use of structure (3.MP. 7)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Rounding to the Nearest Ten	4	**TM T7** Number Line		• fine-tipped marker or pen • pencil
Activity 2 Playing Round & Add as a Class	8	**TM T8** Round & Add	• one die numbered 1–6 • one die numbered 4–9	• pencils or fine-tipped markers, 1 red and 1 blue • pencil or pen • calculator (optional)
Activity 3 Playing Round & Add in Pairs	13	**NCSB 15*** Round & Add	• half-class set of dice numbered 1–6 • half-class set of dice numbered 4–9	• Number Line (TM T7, saved from Activity 1) • Round & Add (TM T8, saved from Activity 2) • colored pencils or fine-tipped markers • pencils • half-class set of calculators (optional)

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master. ** Run 1 copy of this page for display.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

multiple*
place value
rounding*
tens

Mathematical Background

Flexible thought with numbers and many estimation skills are related to the ability to round a not-so-nice number to a "friendlier" number. The reason for rounding may be to make a mental computation easier, to compare a number to a referent students are more familiar with, or to help store the number for easier memory retrieval. Rounding can be a tough concept for some students to grasp, especially if it is taught in the abstract only as an application of a rule. The terms "rounding up" and "rounding down" can add to the confusion. Students with language delays or second language learners are often very literal and may wonder where this "up" and "down" is that is referred to in the rounding process. It's valuable to give students contexts to help them understand why they might want to make a number friendlier and memory devices and models that will help trigger the correct application of the rounding rules. Some teachers have found it helpful to turn a number line to a vertical rather than horizontal format when they are first introduced to rounding. Then, have students think of rounding in terms of stepping up to the next number or staying where they are. This helps students connect the concepts of rounding up or down to physical movements. It might even be helpful to bring in a step stool as a physical model or "rounding tool" to help students make the connection.

November Solving Problems

One-Step Story Problems with Equations

Overview

Instead of working on problem strings this month, students solve story problems and write equations to represent the problems. They are introduced to a process of discussing and solving problems and then sharing and discussing their work, which will be repeated throughout the year. This month, students not only solve story problems but also work on writing equations with a variable standing for an unknown quantity.

Skills & Concepts

- Solve multiplication story problems with products to 100 involving situations of equal groups or arrays (3.OA.3)
- Solve for the unknown in a multiplication equation involving 3 whole numbers (a multiplicand, multiplier, and product) (3.OA.4)
- Fluently add with sums to 1,000 and subtract with minuends to 1,000 (3.NBT.2)
- Use strategies based on place value, properties of operations, or the relationship between addition and subtraction to add fluently with sums to 1,000 and subtract fluently with minuends to 1,000 (3.NBT.2)
- Make sense of problems and persevere in solving them (3.MP.1)
- Construct viable arguments and critique the reasoning of others (3.MP.3)
- Model with mathematics (3.MP.4)
- Use appropriate tools strategically (3.MP.5)

Materials

Activities	Day	Copies	Kit Materials	Classroom Materials
Activity 1 Introducing Equations with Variables	3	**TM T9** Story Problems with Equations		
Activity 2 Solving Problems with Equations	7	**NCSB 16–17*** Field Trips		
Activity 3 Discussing Problems with Equations	9			

TM – Teacher Master, **NCSB** – Number Corner Student Book
Copy instructions are located at the top of each teacher master. ** Run 1 copy of these pages for display.*

Vocabulary

An asterisk [*] identifies those terms for which Word Resource Cards are available.

difference*
equation*
product*
sum or total*
variable*

Preparation

Between Activities 2 and 3, you will look at student work and decide which students should share their work. See more guidelines in Activities 2 and 3.

Mathematical Background

Understanding and solving story problems is an important, and challenging, part of mathematical work. In those months when the Solving Problems workouts focus on story problems, students will sharpen their ability to decipher story problems, make estimates, identify and implement plans for solving the problems, and evaluate whether their solutions are reasonable. This month, students are introduced to a protocol in which they solve problems one day and discuss their strategies for solving those problems a few days later. When sharing, only a few students may be formally invited to present, but the entire class is accountable for the discussion. By asking questions, adding on, and summarizing the work of others, all students can and should engage in the conversation.

This month, students are introduced to the idea of writing equations with variables. First they solve a variety of equations with variables to become more familiar with such equations and to explore the idea that the variable can be in any position in the equation. Then, they read a story problem and match the problem to a given equation. Finally, they work on a story problem in which they write their own equation and then solve the problem. This supported sequence helps students become familiar with the idea of writing equations with letters standing for the unknown quantity and then solving those equations to solve the problem. This kind of problem solving is critical for students' future success in algebra.

Key Questions

Use these questions to help guide students' discussion this month.

- What is the problem asking?
- What information in the problem will help you figure it out?
- Can you draw a picture of the problem?
- Can you write an equation for this problem?
- Can you make an estimate?
- Is your answer reasonable? How do you know?
- How can you check your work after you have solved the problem?
- Can you write a story problem that uses the same math skills and concepts?

Day 1

Date:

Calendar Grid	Calendar Collector	Computational Fluency
	Activity 1 – Introducing the Unit Fraction Race (pg. 15)	
Number Line	**Solving Problems**	**Assessment**

Activity 1

Introducing the Unit Fraction Race — Day 1

1 Open today's activity by introducing the term *unit fraction*.

- Explain that in this month's Calendar Collector, students will collect unit fractions.
- Hold up a ½, ¼, and ⅛ fraction piece and explain that each of these is a unit fraction.
- Ask students to think quietly about what these unit fractions have in common. What do they think it might mean for a fraction to be a unit fraction?

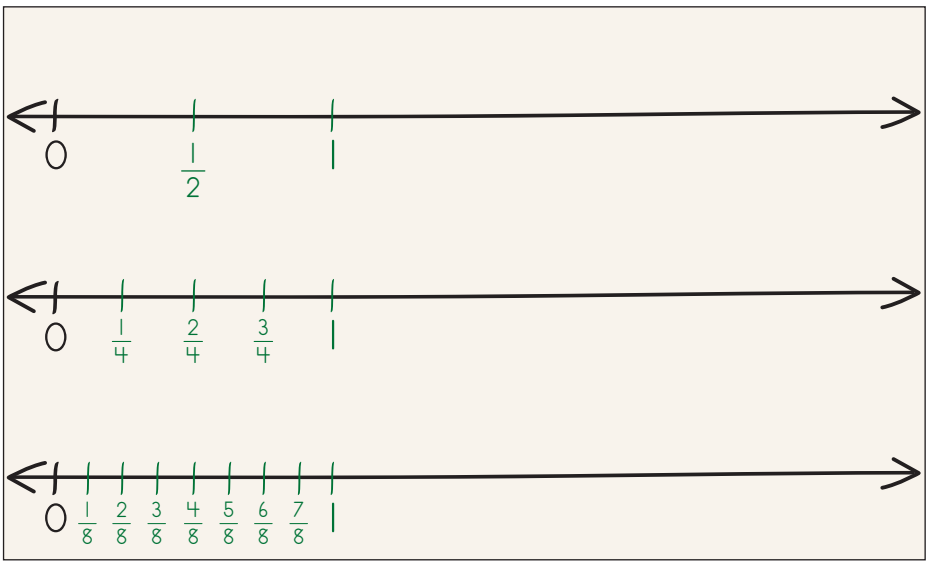
> ***Teacher*** *Here I have three different unit fractions: ½, ¼, and ⅛. Take a minute to think about what these unit fractions have in common. What do you think makes something a unit fraction? Think quietly for a minute and then we'll talk together in pairs and as a group. …*
>
> ***Students*** *They're not the same size. So it can't be about size.*
>
> *Yeah, ½ is a lot bigger than ¼ and ⅛.*
>
> *They're all 1-something: 1 half, 1 fourth, 1 eighth. See what I mean?*
>
> *Oh yeah, you can see that on them too. You can see the 1 at the top of each fraction.*

- After some discussion, clarify that a unit fraction has a 1 in the numerator. It represents just 1 of some number of equal pieces of a whole. The unit fraction ⅛ is 1 of 8 equal parts of a whole; the unit fraction ¼ is 1 of 4 equal parts of a whole; and the unit fraction ½ is 1 of 2 equal parts of a whole.

2 Draw students' attention to the three open number lines you prepared ahead of time, and ask them to think about how they could use the ½ unit fraction piece you were just discussing to mark the points ½ and 1 on the topmost number line.

3 After students have had some quiet time to think, ask them to share some ideas in pairs. Then work with the class to label the points as shown in step 4.

4 Repeat steps 2 and 3 with the ¼ and ⅛ pieces.

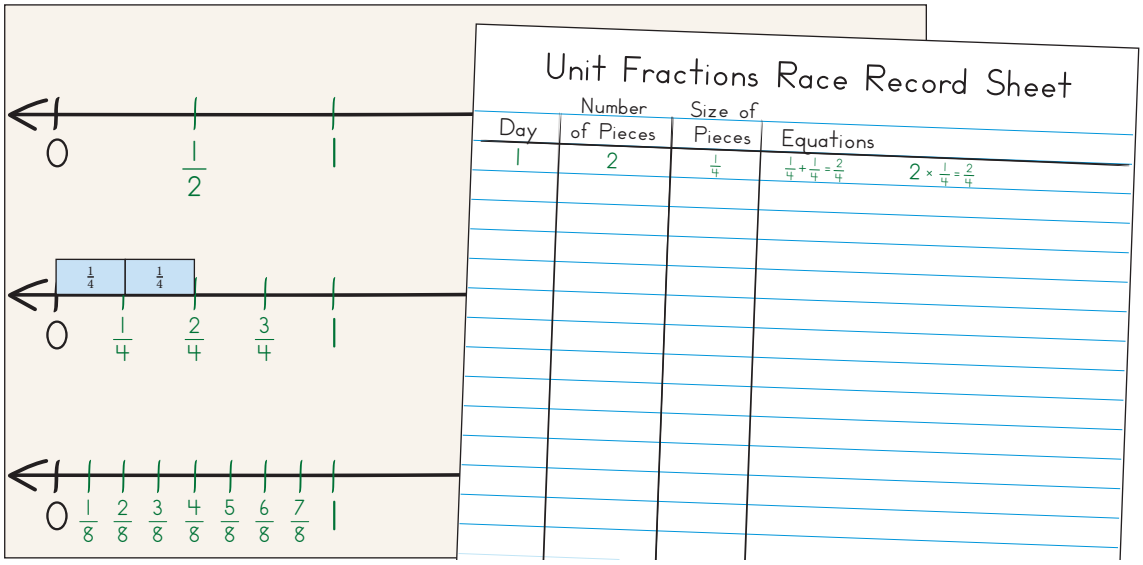


5 Then explain how the Calendar Collector will work this month.

- Each day, a student helper will spin both spinners. The first tells how many pieces to collect, and the second tells what size piece to collect.
- The helper records the spins on the record sheet and writes an addition or multiplication equation to show how much the fraction pieces are worth in all.
- Then the helper takes the fraction pieces identified by the spins and glues or tapes them to the appropriate number line.
- The helper labels the ending point of their strips on the number line. (The example in step 6 will clarify this.)

6 Work with the class to update the Calendar Collector for today.

- Model how to label the number line to show the total. In this example, they started at 0 and added two ¼ pieces, so they mark ²⁄₄.
- Also model how to write an addition and multiplication equation to show the total.



Day 2

Date:

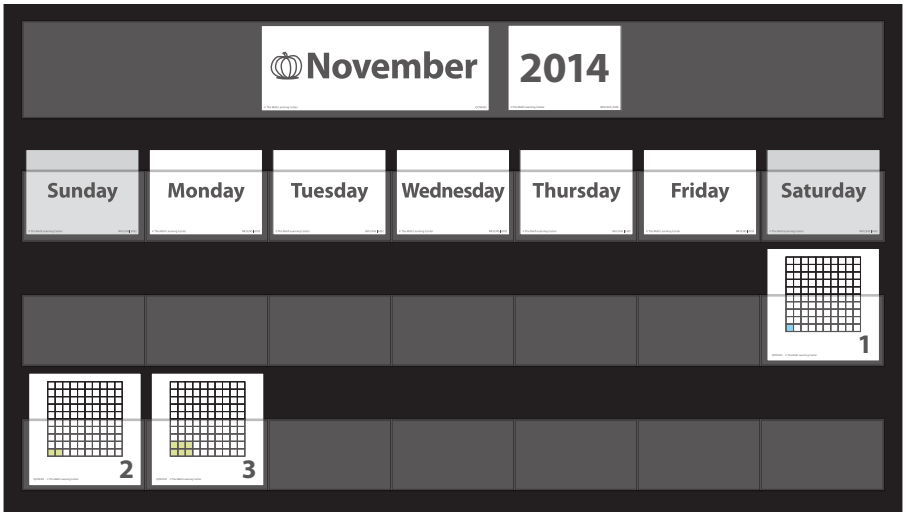
Calendar Grid	Calendar Collector	Computational Fluency
Activity 1 – Introducing the Calendar Grid (pg. 9)	*Update*	
Number Line	**Solving Problems**	**Assessment**

Activity 1

Introducing the Calendar Grid — Day 2

1 Gather students in front of this month's Calendar Grid and explain that the pattern will help them understand more about multiplication by looking at factors and products on arrays.

2 Post today's marker, as well as any markers that come before it if you are not starting on the first of the month.



3 Ask students to look at the markers silently, and tell them that they will share observations about the markers in a few moments.

4 Before introducing the Calendar Grid Observations Chart, have students share observations in an informal way.

- Ask students to share observations in pairs.
- Ask volunteers to share with the group, or select students at random to share with the group.
- Encourage students to notice the dimensions and number of units in each array, and invite them to think about the relationships among the arrays.

> ***Students*** *They get bigger every time.*
>
> *That first one is a tiny square and then a rectangle.*
>
> *The rectangle is twice as big as the square.*

ELL Calendar Grid patterns are great for ELL students because they are so visual. Help ELL students understand that they should look for patterns. Encourage them to share their thinking, even if they need to use words in their own language. Say and write examples of important vocabulary as they come up, and point to examples when possible.

5 Introduce the Calendar Grid Observations Chart and work with students' input to fill in the information about the markers that have been posted so far.

- Show students the Calendar Grid Observations Chart you made ahead of time.
- Explain that charts and tables can help people keep track of information and find patterns.
- With students' help, fill in the chart for all the markers posted so far on the Calendar Grid.
- Review the meaning of *area* and how to find the area of each array as necessary. (Area is the total number of square units it takes to cover a figure or region.)

6 Ask students to use the information on the chart and on the markers to make predictions about what future markers will look like and what the patterns might be.

- Ask students to study the markers in silence.
- Ask students to predict what the next marker might look like.
- Record several of their predictions on construction paper posted beside the chart paper.

> ***Students*** *I think they will all be squares or rectangles. If we fill in the height and length for each one, they have to be squares or rectangles.*
>
> *I think they will get bigger each day.*
>
> ***Teacher*** *When you say "bigger," what do you mean? Are they taller, wider, or something else?*
>
> ***Students*** *Well, the rectangle in marker 2 is longer than the first one. And the third one is taller than the second one.*
>
> *I think there will be pattern in how much bigger each one is. The second one is twice as big as the first one and the third one is twice as big as the second one. Maybe each one is twice as big as the last.*

Calendar Grid Observations

Date	Color	Height x Length	Area	Square?	Observations
1	blue	1 x 1	1	yes	that first one is a tiny square.
2	green	1 x 2	2		I think tomorrow will be a rectangle.
3	green	2 x 3	6		they're like miniature number charts.

7 Wrap up today's workout by explaining the update procedure for this month's calendar grid.

- Each day that the Calendar Grid is not a featured activity, a student helper will post that day's calendar marker (and any other necessary markers).
- The student will also add information about the markers to the Calendar Grid Observations Chart. Invite them, also, to record in the last column observations that are mathematical and related to patterns they see emerging.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Day 3

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
	Activity 1 – Introducing Equations with Variables (pg. 34)	

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Activity 1

Introducing Equations with Variables — Day 3

1 Begin by explaining what students will do in the Solving Problems workout this month.

- Students will focus on solving story problems.
- They will work on figuring out what a story problem means, locating the information they need to solve the problem, and developing a strategy for solving the problem.

2 Ask students to think for a moment about what problem solving means to them, and then, after a minute of quiet thinking time, invite several students to share their ideas.

> ***Students*** *It's figuring out a problem. Not just the answer, but what the problem is all about.*
>
> *It makes me think of story problems or story problems.*
>
> *When I try to solve a story problem, I am not always sure if I have the right answer.*
>
> *Sometimes problems are about plus or minus or times. Sometimes they are more like puzzles you have to figure out.*
>
> *Yeah, a puzzle is a problem.*
>
> *Sometimes when I have a fight with my brother, my grandma says we need to figure out a way to solve our own problem. But that's not math.*
>
> ***Teacher*** *Are all problems about math? What is a problem, anyway?*
>
> ***Students*** *Um, something that makes you confused for a little while.*
>
> *A question you don't know the answer to right away.*
>
> *Something you need to figure out.*
>
> ***Teacher*** *Those are some really interesting ideas. I like what you all said about puzzling things over, making sense of a situation, and figuring things out even if they're a little confusing. Solving problems is challenging, and like doing puzzles or figuring out your differences, it can also be really fun and satisfying. You're right that we're going to be talking about mathematical problems in math class.*

3 Review the meaning of the word *equation*. Explain that when solving a mathematical problem, you can use an equation to first represent the problem and then solve it.

- Use the *equation* Word Resource Card to review the meaning of the word.
- Remind students that they have seen and written many equations before.
- You might ask them to share when they have written their own equations before.

Primarily, students will have written equations to represent their strategies for solving problems and completing calculations. It is unlikely that third graders will have had a lot of experience writing equations to first represent and then solve story problems, though they will have had many experiences writing equations to show how they went about solving problems in the past.

Key Questions

Use these questions to help guide students' discussion this month.

- What is the problem asking?
- What information in the problem will help you figure it out?
- Can you draw a picture of the problem?
- Can you write an equation for this problem?
- Can you make an estimate?
- Is your answer reasonable? How do you know?
- How can you check your work after you have solved the problem?
- Can you write a story problem that uses the same math skills and concepts?

4 Write the equation $4 \times 6 = t$ where everyone can see it, and ask students to study this equation for a moment.

5 Then ask students to share what they notice about the equation, and use their observations to initiate a discussion about what a variable is and how to determine the value of the variable *t*.

> ***Students*** *Four times 6 is not so hard, but what is that* t *doing there?*
>
> *Usually, there would just be a blank for the answer.*
>
> *The* t *must mean the answer.*
>
> ***Teacher*** *It's true that you've seen a lot of equations like this that have a blank instead of a letter. Mathematicians often use a letter or a symbol to stand for something they don't know. This is called a* variable. *Does anyone know what* t *equals?*
>
> ***Jayla*** *Four times 6 is 24, so I think* t *is equal to 24.*
>
> ***Teacher*** *Raise your hand if you agree that* t *is equal to 24. … In our equation* t *is the product of 4 times 6, which is 24.*

6 Give students time to solve each of the equations below one at a time. Discuss each one as you go, and invite students to explain how they determined the value of each variable.

$4 \times t = 24$ $t \times 6 = 24$ $3 \times m = 15$ $c - 7 = 10$ $25 + 25 = f$

7 Display the Story Problems with Equations Teacher Master, showing only the problem at the top of the page, and invite a student to read the problem aloud.

8 Ask students to turn to a partner to come up with an equation with a letter standing for the unknown quantity that represents the problem.

Students might have difficulty writing their own equations at this point. If so, you might suggest that they first solve the problem and then write an equation with an unknown to represent the problem. You might need to emphasize that the equation should represent the problem situation itself, not necessarily their strategy for solving the problem. For example, many students are likely to add 4 to 26 to get to 30 and then add 20 more to get to 50. Therefore, the solution is 24; Brian needs $24 more to have a total of $50. The equation 26 + 4 + 20 = 50 would accurately represent this strategy for solving the problem, but 24 + m *= 50 represents the problem situation itself: The 26 dollars Brian has plus another amount of money (*m*) is equal to 50 dollars. You might also help students write an equation for the problem situation by talking out the situation in this way and then using the solutions they calculated to check whether the equation works for the problem.*

ELL Make a sketch of the problem situation and connect the sketch to the equations as students work through this problem.

9 Next, reveal the list of equations below the story problem and ask students to choose the equation that best matches the story problem. Give students some quiet thinking time, and then invite a few students to share and justify their choices.

> ***Students*** *At first the equations all looked confusing, but then I realized that I knew some of them did not work for sure. Because I knew the answer was $26, and some of the equations just don't work if you put 26 where the* m *is.*
>
> *I tried to think about what operation I would use to solve the problem, and then I looked for that operation in the list of equations.*
>
> *I think it's an addition problem because he needs more money, so c shows addition. I think it's c.*
>
> *I think it is d. It sounds like a subtraction problem. How much more money does Brain need? You could figure it out by taking 24 away from 50.*
>
> *That makes sense to me, but I thought it was b because you could start at 24 and go up to 50 to find out how much more he needs.*

10 After students have determined that equations b and d can both be used to represent this problem, conclude this activity by letting them know they will continue working on these skills in the next Solving Problems activity.

Day 4

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
Activity 1 – Rounding to the Nearest Ten (pg. 28)		

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Activity 1

Rounding to the Nearest Ten — Day 4

1 Display the Number Line Teacher Master, and ask students to study it quietly for a moment.

2 Then ask students to turn and talk to a partner about what they notice about this number line.

- Ask students to share observations with each other.
- Ask students to talk to each other about how they would label the rest of the markings on the number line.
- Can they think of any numbers they could place on this number line with absolute confidence?

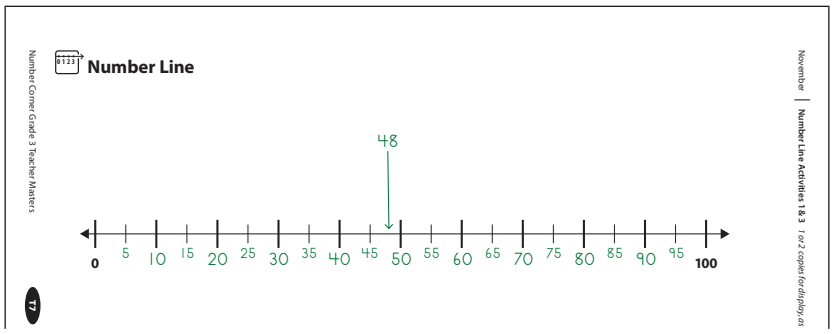
3 Label the markings with input from the class.

- Ask a volunteer to help label one of the markings. Which one do they feel certain about? How can they tell what number to place there?
- Continue to get input from students about how to mark the number line. Write the multiples of 10 in larger numbers and the multiples of 5 between them in smaller numbers.

4 When the number line has been labeled, ask students to talk in pairs about where they would place the number 48 and why.

5 Invite a pair of students to share with the group where they would place 48 and explain how they figured it out. Use a pencil to label 48 on the number line.

> ***Hannah*** *We said we'd put it between 45 and 50.*
>
> ***Teacher*** *Can you and Miguel come up and show us where?*
>
> ***Miguel*** *Right here.*
>
> ***Teacher*** *How do you know that?*
>
> ***Miguel*** *Well, 48 is more than 45 but less than 50.*
>
> ***Hannah*** *Yeah, it's 3 more than 45 and 2 less than 50, so it's a little closer to 50 than it is to 45.*



6 Introduce the idea of rounding to the nearest ten by connecting it to the work students just did.

> ***Teacher*** *When you were thinking about where to put 48 on the number line, you were thinking about how close 48 is to the other numbers on the line. When we round numbers, we can use the number line to help. If we were rounding 48 to the nearest ten, we can*

Key Questions

- What multiple of 10 comes before ___?
- What multiple of 10 comes after ____?
- What is ___ rounded to the nearest 10?

Literature Connections

These would be good books to share with your students this month:

- *Coyotes All Around* by Stuart Murphy
- *Farmer's Market Rounding* by Julie Dalton

think about whether it is closer to the two multiples of ten that it is between: is 48 closer to 40 or to 50?

Students *It's a lot closer to 50!*

Teacher *Right, you can see that on the line pretty easily, huh? So 48 rounded to the nearest ten is 50. We can round numbers when we just need an estimate, not an exact number. So if we've been in school for 48 days so far this year, we might say, "We've been in school for about 50 days." That would give someone a much better idea of how long we've been in school than saying that we'd been in school for about 40 days.*

7 Now invite students to practice rounding the following numbers to the nearest ten, using the number line to help: 23, 44, 57, 96, 82.

SUPPORT If students seem to need quite a bit of scaffolding to get comfortable with rounding to the nearest ten, structure your questions in a deliberate and sequenced way. For example: Between which multiples of ten would we put 23 on the number line? (20 and 30) Which multiple of ten is 23 closer to? (20) So what is 23 rounded to the nearest ten? (20) You might also mark each number on the number line to provide a visual scaffold.

CHALLENGE Invite students to think of some examples of when they might round these numbers to the nearest ten. For example, if there were 23 students in the class, they might say that there are about 20 students in the class. If they had basket with 44 crayons in it, they might say that they had 40 crayons in the basket. You might also ask students to think of other numbers that round to the same ten. For example, 82 rounded to nearest ten is 80. What are some other numbers that round to 80? [77, 84, 81, 79]

8 Finally, review rounding numbers with a 5 in the ones place to the nearest ten.

- Ask students how they would round 65 to the nearest ten.
- Give them a moment to talk in pairs and then have a few students share.
- After students have shared a few ideas, let them know that mathematicians decided that if a number is exactly halfway between two multiples of ten, we round it up to the higher multiple of ten, so 65 rounded to the nearest ten is 70.
- Then ask students what 35 is rounded to the nearest ten.

9 Conclude the activity by explaining that in the next Number Line activity, they will play a game that will give them practice rounding.

Note Save the Number Line Teacher Master for use again in Activity 3, when you'll display it again for a quick review of rounding. (Or if your copy is the worse for wear after this activity, you can just use a fresh copy for Activity 3.)

Day 5

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Day 6

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	**Activity 2 –** Labeling the Number Lines & Making Predictions (pg. 17)	
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

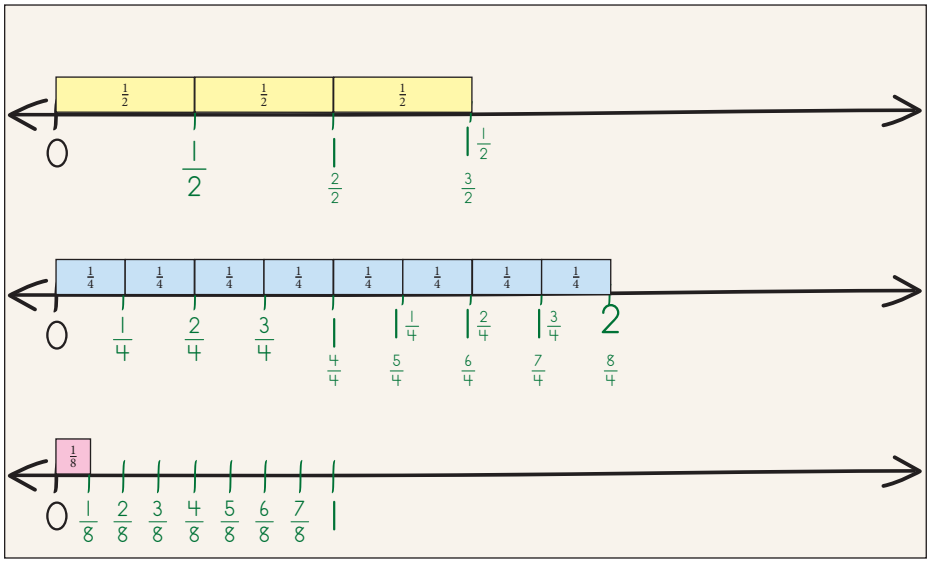
Activity 2

Labeling the Number Lines & Making Predictions Day 6

1 Open today's activity by first updating the collector for the day with students and then giving them a minute to look at the number lines and the record sheet before sharing some observations.

2 Use students' observations as a way to begin labeling the parts of each number line that have been filled with unit fraction pieces, as shown in this example.

- Point out that numbers greater than 1 can be expressed both as *mixed numbers* and as *improper fractions*. A mixed number (e.g., 1 ¼) is a combination of a whole number and a fraction. An improper fraction (e.g., ⁵⁄₄) is one in which the numerator (number on the top) is greater than the denominator (number on the bottom). Use the Word Resource Cards to clarify these key vocabulary terms.
- Encourage students to count the unit fraction pieces to figure out how to label each point.



Unit Fractions Race Record Sheet

Day	Number of Pieces	Size of Pieces	Equations	
1	2	1/4	1/4 + 1/4 = 2/4	2 × 1/4 = 2/4
2	3	1/2	1/2 + 1/2 + 1/2 = 3/2	3 × 1/2 = 3/2
3	1	1/8	1 × 1/8 = 1/8	
4	1	1/4	1 × 1/4 = 1/4	
5	3	1/4	1/4 + 1/4 + 1/4 = 3/4	3 × 1/4 = 3/4
6	2	1/4	1/4 + 1/4 = 2/4	2 × 1/4 = 2/4

3 Determine the running total for each number line, and then invite students to make some predictions.

- Which number line do they think will be most full by the end of the month?
- About how far do they think they will they get on each number line by the end of the month?

> ***Ayesha*** *There is no way that the ⅛ number line is going to win. Look at it!*
>
> ***Teacher*** *Do the rest of you think that's true? Is there any way that the ⅛ line could catch up to the others?*

Students *Umm, it doesn't seem like it. The most we could get each day is ⅜.*

OK, so what if we got ⅜ for 5 days in a row?

That would be 15 eighths.

How much is that?

Well, 1 is ⅝, so a lot more than 1.

I don't think that's going to happen. The eighths are just so much smaller than the halves. Even though the spinner has a lot more ⅛ parts, I don't think it's going to happen.

4 Before closing today's workout, take a few minutes to answer questions students have about the update procedure or concepts related to fractions.

.....

Day 7

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
	Activity 2 – Solving Problems with Equations (pg. 36)	

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Activity 2

Solving Problems with Equations — Day 7

1 Open today's activity with a quick review of equations with variables.

- Write the equation $3 \times m = 24$ where everyone can see it.
- Ask students to turn to a partner and discuss what number they could write for m to make the equation true.
- Then invite students to share their thinking.

> ***Students*** *I think it is 8 because 3 times 8 is 24.*
>
> *I agree. Three groups of 8 makes 24… 8, 16, 24.*
>
> *I'm still kind of confused about why there are letters in math problems. I guess I can figure it out, but it seems weird to me.*

2 Display just the top half of your copy of the first Field Trips page from the Number Corner Student Book, and introduce today's activity.

- Let students know that today they will solve some problems about a school field trip.
- They will be writing their own equations to represent each of those problems.
- Explain that they will solve one problem as a class and then try one or two more on their own.

3 Work on the first problem together as a class.

- Invite a student to read the first problem aloud.

  ELL Help English language learners understand the context. Ask them about their experience with field trips or visiting a science museum. As they work on the problems, help them underline the important words and encourage them to ask questions about any vocabulary they do not understand.
- Ask students to open their Number Corner Student Books to the Field Trips page.
- Go through each step of the problem with the class, one part at a time.
- Have students record work in their Number Corner Student Books.
- Finally, have students solve the problem. Invite them to share their answers.

4 Ask students whether they have any questions about writing an equation for a story problem or about solving story problems in general. Then, ask them whether writing the equation helped them solve the problem.

Let students know that sometimes it may be easier to write the equations first and then solve the problem and other times it may be easier to work on solving the problem and then come up with the equation.

5 Review the second Field Trips problem, and then give students time to work on the problem in pairs.

- Reveal the problem on your display copy of the page.
- Invite a student to read it aloud.
- Tell students that they will solve the problem with a partner, but each student should record work in their own books.
- Ask students if they have any questions, and then have them get started.
- Encourage students to be thorough in recording their work so that they can make sense of it when they discuss their solutions and strategies in a few days.
- Students can continue on to the third problem if they finish the second one.

CHALLENGE Some students might appreciate the opportunity to work independently and then compare their work with a peer. Encourage these students to work together to resolve any differences of opinion about the solution to the problem and the equations they wrote to represent it. Remind them that although there is just one correct solution to the problem, there are different ways to represent the problem with an equation.

6 As students work, circulate around the room to make observations, answer questions, and offer differentiated instruction.

SUPPORT It may help to display the Story Problems with Equations Teacher Master from Activity 1. This page shows sample equations with variables as letters. If students are unsure about how to include a letter in their equations, have them write the equation without a letter and then figure out where the letter would go. If students are unsure how to solve the problem, have them draw a picture of the problem. Also remind them that an open number line can be a helpful model for solving addition and subtraction problems.

7 At the end of the activity, ask students to finish their work. Let them know they will discuss these problems in a few days.

Look over student work sometime before Activity 3. Notice any students struggling to come up with equations. Think about what could help these students when the work is shared and discussed in the next activity. Be prepared to encourage these students to ask questions and clarify their understanding. Look for student work that could help others better understand solving problems and writing equations with variables.

.....

Day 8

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
Activity 2 – Playing Round & Add as a Class (pg. 30)		

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Activity 2

Playing Round & Add as a Class — Day 8

1 Display the Round & Add Teacher Master, and give students a moment to study it quietly.

2 Then ask students to share what they notice about it.

Students will probably notice that the number line looks very similar to the one they marked last week. They might also notice that this number line does not include marks for the multiples of 5 that fall between each multiple of 10.

3 Work with students to mark the multiples of 10 on the number line.

4 Explain that they will use this number line to play a game that will give them practice rounding and adding. Then describe how the game is played.

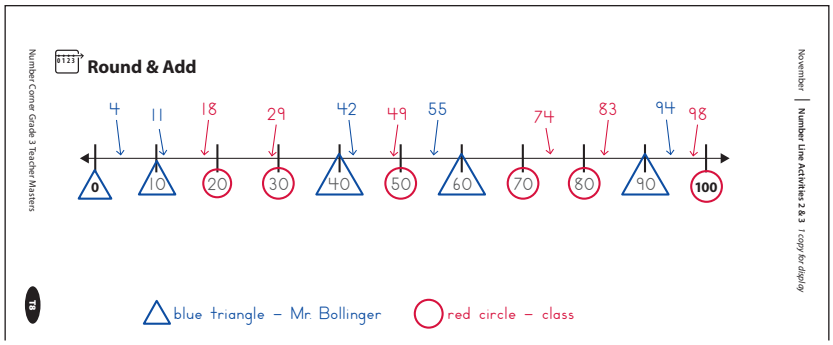
- The first player begins by rolling two dice, one marked 1–6 and the other marked 4–9.
- The player arranges the two numbers rolled to form a 2-digit number.
- The player marks the number on the number line and then circles the multiple of ten to which it rounds using their color (red or blue).
- Players take turns rolling the dice, arranging the digits, marking the two-digit number they created, and claiming the multiple of ten to which their number rounds.
- Once a multiple of ten has been claimed, it cannot be claimed again.
- Either player can decide to use just one die if they want to claim the 0 or the 10.
- Once all the multiples of 10 on the line have been claimed, players predict who will have the highest sum.
- Then players find their exact sums, and the player with the higher sum wins the game.
- Let students know that toward the end of the game there might be lots of opportunity for practicing rounding skills without being able to claim any of the multiples of ten.

ELL Model how to play the game with gestures as you state the directions. If possible and if necessary, have a bilingual student translate or explain the rules for the game. While playing, encourage ELL students to participate as much as possible.

SUPPORT Encourage students to use the number line to help see which multiple of ten their number is closer to. You may also want to review the rule for numbers with a 5 in the ones place. Circles and triangles, in addition to colors, can be used to distinguish the teacher's and students' numbers in case students have difficulty distinguishing colors.

5 Play the game teacher versus students. Take the first turn to model how the game is played.

6 After all the multiples of 10 have been claimed, ask students to make a prediction of who will have the highest sum. Invite them to consider whether it's necessary to add up all the numbers actually rolled by each team to make such a prediction. Why or why not?



Frank *We got lots of high numbers. We got the 70 and the 80 and the 100.*

Alana *We got 6 of the multiples and you only got 5. We'll probably win.*

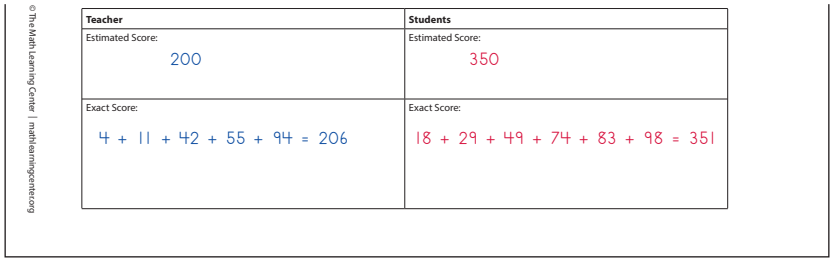
Teacher *Do you think it's possible to make a pretty accurate prediction without actually adding all the numbers we rolled?*

Risha *Sure! Just use the rounded numbers like we've been doing. The numbers we rolled are pretty close to those multiples, and it's way easier to add the tens in our heads than numbers like 74 and 83 and 98.*

Ahmad *If we just add 70 + 80 + 100, that makes 250. Your highest numbers are 60 and 90, and that's only 150. Even if you put on your 40 and 10, that's only 200, so we're ahead.*

7 Take a moment to explain that rounding can be very helpful when you don't need an exact calculation. For example, students might be able to determine who has won the game by finding the sums of each team's rounded numbers. In and of itself, rounding is a trivial skill, but it is very helpful when used in conjunction with computation: children and adults with strong number sense do it all the time.

8 Now invite students to find the exact sum of your numbers and the exact sum of their numbers and then evaluate whether the predications they made based upon the rounded numbers were accurate.



SUPPORT Invite students to use a calculator to find the exact sums.

CHALLENGE Invite students to use mental or paper-and-pencil strategies to find the exact sums.

Note Save the completed game page for use in Activity 3 when you will review how the game is played before having students play in pairs.

Day 9

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
	Activity 3 – Discussing Problems with Equations (pg. 38)	

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Activity 3

Discussing Problems with Equations — Day 9

1 Open today's session by spending a few minutes reviewing students' work on the Field Trips Number Corner Student Book pages from Activity 2.

- Have students open their Number Corner Student Books to the Field Trips pages.
- Ask them to look over their work to get ready for a class discussion about these problems, especially problem 2 (and problem 3 if they had time to solve it).
- If many students did not finish problem 2, give them a few minutes to finish it now. Don't worry if they did not finish problem 3.
- Ask students to think about their experience solving the problem. Was it hard? Easy? What was hard about it? Was it useful to write equations? Was it easier for them to write the equation before solving the problem or after?

2 Let students know that they will share their work on this problem, and explain the expectations for this discussion (and future discussions during Solving Problems workouts).

- Let students know that while not all students will share their work, all students can and should participate in the conversation by contributing their thoughts or questions.
- Tell students that you may ask them to summarize or restate something another student said or did.
- Explain that you might also invite them to ask questions of each other.

3 Invite the student pairs you selected earlier to share their work on problem 2, one pair at a time. Have them explain what the problem was asking them to do, how they wrote an equation for the problem, and how they solved the problem.

SUPPORT Encourage students who had a hard time with the problem to ask questions or share what was hard to help them make sense of these challenges.

During the discussion, look for opportunities to emphasize the following important points:

- Key words are not always helpful. For example, problem 2 uses the words "in all" which makes the problem sound like an addition problem. Students may be tempted to add 51 and 25 when they need to subtract 25 from 51.
- There is more than one way to write an equation for problem 2.
- Students can solve the problem before writing an equation if that helps.

> ***Ingrid*** *At first we were kind of confused by the words in the problem. We underlined "in all" which made us want to add 51 and 25.*
>
> ***Billy*** *But that didn't really make sense with the rest of the problem. We were pretty sure we were supposed to subtract 25 from 51.*
>
> ***Ingrid*** *Right, because we have to figure out how many turtles are in the other tank. That should be 51 minus 25.*
>
> ***Billy*** *So, that is what we wrote for our equation: 51 minus 25 equals* t.
>
> $51 - 25 = t$
>
> ***Teacher*** *Raise your hand if you also wrote the same equation, or the same equation with a different letter. You could use any letter. OK, many of you did, but not all of you. Does anyone have a question at this time?*
>
> ***Carl*** *We have a different equation. Is that OK? Is this one of those problems where there are different equations?*

Teacher *Tell us what you did.*

Carl *We started by drawing a picture of the problem to help us understand what it was asking. We drew one exhibit and labeled it 25 turtles. We drew another one and write a question mark on it. Then we put a plus sign between the exhibits and "equals 51" on the side.*

Devante *That helped us think about our equation. We wrote 25 + a = 51. Is that OK?*

$25 + a = 51$

Teacher *Class, what do you think?*

Students *Your picture helps me think about the problem too. That was a good idea.*

I think that you can figure it out that way. Addition and subtraction are connected.

What is your answer?

Carl *We got 26. It was pretty easy to start at 25 and go up to 51. We just added another 25 to get to 50 and then one more to get to 51.*

Teacher *Who can summarize what this pair did to write the equation and solve the problem?*

4 In any time remaining, invite students to share their work on problem 3. If students did not have time to solve the third problem in Activity 2, give them time to work on it now.

5 At the end of the activity, ask students to think silently for a moment about writing equations to match story problems. What do they know now that they didn't know before? What is still confusing for them about this approach to problem solving?

Day 10

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Activity 2 – Exploring Patterns & Using the Area Model (pg. 10)	*Update*	
Number Line	**Solving Problems**	**Assessment**

Activity 2

Exploring Patterns & the Area Model — Day 10

1 Open today's workout by working together with students to complete the update procedure.

- Have a volunteer post today's marker (and any other markers required to bring the calendar up to date).
- Add information to the Calendar Grid Observations Chart, with student input, about the new array(s).

2 Give students time to study the grid and observations chart in silence. What patterns do they notice now that so many markers have been added?

3 Ask students to share what they notice in pairs first and then together as a group.

Quite a few new markers have been added since you introduced the calendar on the second school day of the month. Invite students to come up to the Calendar Grid and the chart to show what they are seeing. You might also invite them to lay the markers out in rows of four, with row starting with a square marker, to highlight some of the patterns that are becoming evident.

- During the class discussion, use Word Resource Cards to help students express their observations using mathematical vocabulary, including the following terms:

dimension	product
area	array
factor	

- Also help students make an explicit connection between the third and fourth columns on the Observations Chart and the formula for finding the area of a rectangle: height × length = area.

4 Pass out a Small Number Chart to each student. Explain that you would like them to use these grids to draw some predictions about future markers.

SUPPORT You might invite students who are struggling with the pattern or with area to draw tomorrow's marker or the next marker that will show a square array.

CHALLENGE You might challenge students to draw the next marker that has a width of 6, for example, or the last marker of the month.

5 Ask students to decide what marker they want to make a prediction about (see the suggestions in the support and challenge notes above), and then ask them to work on their own or with a partner to sketch and label what they think that marker will look like.

Each student should:

- Label the dimensions of the array they draw.
- Label the area of the array they draw.
- Use the correct color to shade in the array.
- Label the date of the marker about which they are making a prediction, if possible.

6 While students work, circulate around the room to offer support, answer questions, and think about which students you'd like to have share their predictions.

7 Invite selected students to share the predictions they drew and explain why they think the marker will look this way. Add the markers they sketched to the display so that students can check on their predictions as the month progresses.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Day 11

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	**Activity 1 –** Introducing Array Race (pg. 22)
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Activity 1

Introducing Array Race — Day 11

1 Open today's activity by displaying the Introducing Array Race Teacher Master and introducing the game.

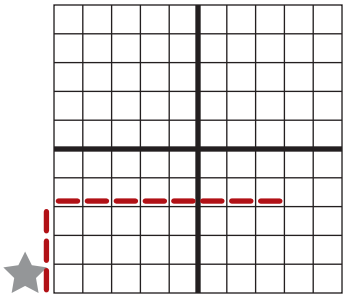
- Tell students that they will play a game called Array Race that will help them practice multiplication facts in a fun way.
- Give students a moment to look at the game board.
- Ask students to share what they notice about the game board.
- Draw students' attention to the first 10–by–10 grid, and ask them to share what they notice about it.

2 Briefly explain the game.

- Array Race is similar to Loops & Groups, which they played in September. In Array Race, players draw arrays instead of loops and groups to represent multiplication problems.
- Players take turns rolling two dice, a 1–6 die and a 4–9 die, to see what size array they should sketch.
- Then, they sketch a frame of the array on the 10-by-10 grid and shade it in.
- Finally, they write an equation that shows the dimensions (factors) and area (product) of the array.
- When each player has had three turns, they add their three products to get a final score.
- Then they roll a More or Less die to determine whether the player with the higher or lower score wins.

3 Explain that for the first game, students will play as a team against you. Then demonstrate how the game works by taking the first turn.

- Roll one of the dice and record the result on your sheet. Explain that this roll tells you how many rows to mark on your first grid.
- Using a colored pencil, mark the left side of your grid, starting from the bottom corner where the star is, to show the number of rows you get to include in your first array. Ask students to help you count the marks as you make them.
- Then roll the other die, and record the result on your sheet. Explain that this roll tells you how many columns to mark on your grid.
- Using the colored pencil again, mark the columns along the tops of the squares where they will appear. Ask students count the marks with you as you make them.
- Now invite students to look at the "frame" you've created with your colored pencil and imagine what it will look like when you fill it in.



Teacher *OK, my array is going to have 3 rows* (points to the 3 marks along the side of the grid) *and 8 columns* (points to the 8 marks across the grid). *Can you imagine what this array will look like when*

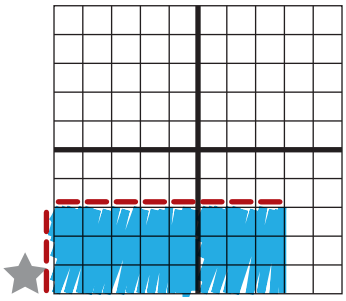
Key Questions

Use these questions to help guide students' discussion this month.

- If you rolled an 8 and a 6, what would you shade in on the 10–by–10 array?
- Can you imagine how your array will look, and how many squares it will include before you shade it in?
- Now that your array is filled in, how many squares are there in each row? How many are there in each column?
- Can you find out how many squares there are in this array without counting them one by one? How?
- What equation(s) can you write to represent your array?
- How can you find the product of 8 and 6 (or other problems)?
- When you shade in 8 by 6 on the 10–by–10 grid, do you see other multiplication problems within 8 by 6? How do they help you find the product of 8 times 6?
- How does the array model help you find the answers to multiplication problems?
- What is an efficient way to find your score?

I color it in with my blue pencil? Talk to the person sitting next to you. How many little squares will I need to color?

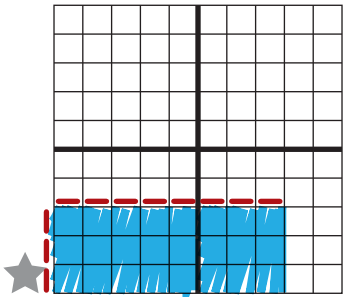
- Then use your blue pencil to shade in the array, and have students confirm that you have colored in an array with the number of rows and columns specified by the two numbers you rolled.



4 Work with input from the class to determine the total number of squares in the array. Encourage students not to count the individual squares, but rather to find a more efficient way to find the total. Then, with their help, write a multiplication equation to represent your array.

- Ask students to talk in pairs about the total number of squares in your array.
- After a few moments, invite 2 or 3 volunteers to share their thinking with the class. Use their observations to generate an equation.

> ***Jack*** *It's 24 because I see 3 rows of 8. And 8 and 8 and 8 are 24: 8, 16, 24.*
>
> ***Brian*** *I looked at it differently. I see a 3-by-5 and a 3-by-3. I know 3 times 5 is 15 and 3 times 3 is 9. Those are easy: 15 and 9 are 24.*
>
> ***Teacher*** *That's a really smart way to find the product. Can someone explain what Brian just said?*
>
> ***Tiffany*** *I think he saw smaller arrays in the array. The 3-by-8 array is also a 3-by-5 and a 3-by-3 array. For him, it was easier to find 3-by-5 and 3-by-3 and add those up.*
>
> ***Teacher*** *Put your thumb up if you think you could try that too. Great. OK, how can we write an equation for this array?*
>
> ***Kian*** *I think it is just 3 times 8 equals 24.*
>
> ***Teacher*** *Yes. You can use the dimensions of the array to help with the equation. It's a 3-by-8 array so the equations is 3 times 8 equals 24.*



5 Now have the students take their first turn.

- Call a student up to the front of the class to make the first roll. Record the result.
- Then have another student make the second roll for the class. Record the result.

- Invite students to imagine how their array will look once it is shaded in, and how many squares they will score.
- When they've had a chance to share ideas for a few moments in pairs, invite a students to shade in the framed array on the displayed sheet.
- Work with students to generate and record a multiplication equation to represent their array.

6 Take turns until both you and the students have had three turns.

- Be sure to elicit a lot of participation from students, both during your turns and theirs.
- Students should not always start with one particular die. In other words, they should not always start with the 1–6 die. You want them to see both rows and columns having a variety of numbers, especially numbers greater than 5.

7 Work with students to determine your total score (the sum of your three products) and theirs (the sum of their three products).

8 Record the scores at the bottom of the page, and then invite a student to roll the more or less die to find out who won the game.

9 Ask students if they have any questions about Array Race. Let them know they will play the game with a partner in the next Computational Fluency activity.

If you have time, invite students to summarize the directions for the game.

Note Keep the teacher master to use in the next activity to remind students how to play the game.

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Day 12

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	**Activity 3 –** Working with Equivalent Fractions & Number Lines (pg. 18)	
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Activity 3

Working with Equivalent Fractions & Number Lines Day 12

1 Begin this activity by first updating the collector for the day with students and then giving them a minute to look at the number lines and the record sheet before sharing some observations and predictions.

2 Work with students to label each number line completely with fractions and mixed numbers if they have not been completely filled in already.

Unit Fractions Race Record Sheet

Day	Number of Pieces	Size of Pieces	Equations	
1	2	$\frac{1}{4}$	$\frac{1}{4}+\frac{1}{4}=\frac{2}{4}$	$2\times\frac{1}{4}=\frac{2}{4}$
2	3	$\frac{1}{2}$	$\frac{1}{2}+\frac{1}{2}+\frac{1}{2}=\frac{3}{2}$	$3\times\frac{1}{2}=\frac{3}{2}$
3	1	$\frac{1}{8}$	$1\times\frac{1}{8}=\frac{1}{8}$	
4	1	$\frac{1}{4}$	$1\times\frac{1}{4}=\frac{1}{4}$	
5	3	$\frac{1}{4}$	$\frac{1}{4}+\frac{1}{4}+\frac{1}{4}=\frac{3}{4}$	$3\times\frac{1}{4}=\frac{3}{4}$
6	2	$\frac{1}{4}$	$\frac{1}{4}+\frac{1}{4}=\frac{2}{4}$	$2\times\frac{1}{4}=\frac{2}{4}$
7	1	$\frac{1}{4}$	$1\times\frac{1}{4}=\frac{1}{4}$	
8	3	$\frac{1}{8}$	$\frac{1}{8}+\frac{1}{8}+\frac{1}{8}=\frac{3}{8}$	$3\times\frac{1}{8}=\frac{3}{8}$
9	2	$\frac{1}{8}$	$\frac{1}{8}+\frac{1}{8}=\frac{2}{8}$	$2\times\frac{1}{8}=\frac{2}{8}$
10	2	$\frac{1}{4}$	$\frac{1}{4}+\frac{1}{4}=\frac{2}{4}$	$2\times\frac{1}{4}=\frac{2}{4}$
11	1	$\frac{1}{8}$	$1\times\frac{1}{8}=\frac{1}{8}$	
12	1	$\frac{1}{8}$	$1\times\frac{1}{8}=\frac{1}{8}$	

CHALLENGE Invite students to compare the record sheet with the number lines to make sure that the correct amount is shown on each number line. Some students might see, for example, that they can focus on each unit fraction one at a time. In the example record sheet here, for instance, they can see that they should have collected a total of 11 fourths, which means that they should have a total of 2 ¾ shown on the number line marked in fourths. As they add the total number of fourths pieces that have been collected, students might recognize that each group of 4 fourths is equal to 1 and use that fact to help calculate the total. In this way, it is possible for students to arrive at a total of 2 ¾ without having explored a formal procedure or algorithm for converting an improper fraction to a mixed number.

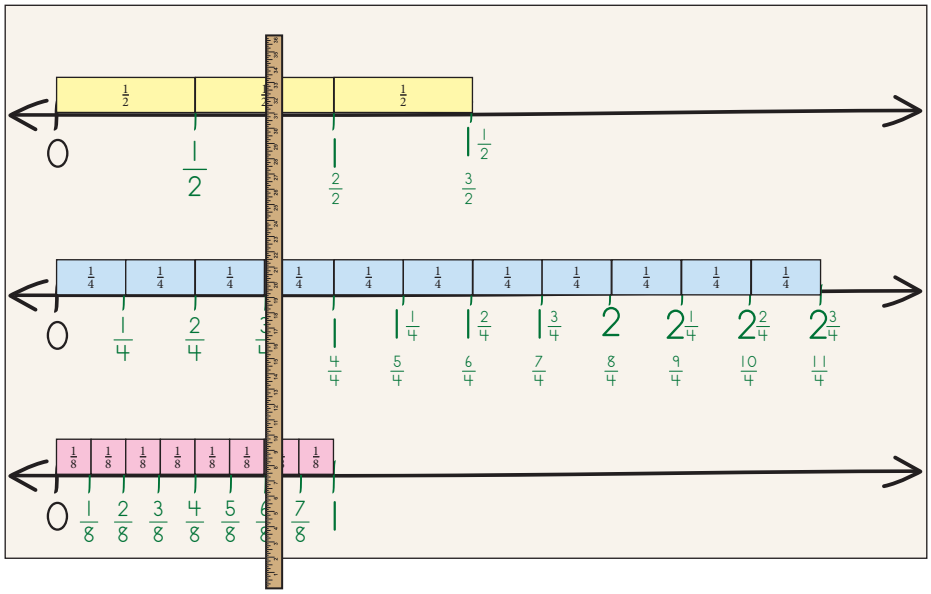
.....

3 Then work with students to use the number lines and unit fraction pieces to explore some equivalent fractions.

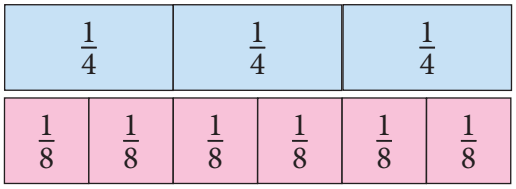
You can use the following examples or generate your own.

- How many eighths are equal to ¾? (⅝)
- How many fourths are equal to 1 ½? (⅔) What is another way to express that fraction? (1 ¾)

> ***Teacher*** *Let's take a look at these number lines together. How many eighths are equal to ¾? Take a minute to think quietly to yourself. … Turn to a partner and talk about how many eighths are equal to ¾. … What did you think?*
>
> ***Students*** *It looks sort of like 6 or 7 eighths are equal to ¾. It's sort of hard to tell.*
>
> *Yeah, we were trying to look at the eighths line and the fourths line together.*
>
> *Here, it we hold this ruler at the ¾ mark and then look at the eighths number line, you can see that it goes to ⅝.*



> ***Teacher*** *Can anyone use the fraction pieces here on the projector to confirm that ¾ is equal to ⅝?*
>
> ***Frank*** *Sure. Here, if you lay them out side by side, you can see that it takes 6 of the eighths pieces to make 3 fourths.*



> ***Annalisa*** *Oh look! That makes sense. See? You can see there are 2 eighths in each fourth. So if there's 3 fourths, there must be 2, 4, 6 eighths.*

4 Give students the rest of the period to work independently on the Fractions on a Number Line page in their Number Corner Student Books.

- Display your copy of the page.
- Read the problems out loud.
- Make the unit fraction pieces you have used in the collector available to students, and encourage them to refer to the three number lines as well.
- While students work, circulate around the room to provide support as needed.

SUPPORT Work in a small group with students who need additional support with these ideas and skills.

5 At the end of the Number Corner period, collect students' books so that you can review their work on the Fractions on a Number Line page to get a quick sense for how individual students are doing with these skills and ideas.

Day 13

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	
Number Line	**Solving Problems**	**Assessment**
Activity 3 – Playing Round & Add in Pairs (pg. 32)		

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

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- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Activity 3

Playing Round & Add in Pairs — Day 13

1 Begin by quickly reviewing how to round to the nearest ten, using the Number Line Teacher Master from Activity 1 for visual support. Invite students to round the following numbers to the nearest ten and explain how they did it: 18, 33, 55, 91, 86.

SUPPORT Structure your questions in a deliberate and sequenced way to provide more scaffolding. For example: Between which multiples of ten would we put 18 on the number line? (10 and 20) Which multiple of ten is 18 closer to? (20) So what is 18 rounded to the nearest ten? (20) You might also mark each number on the number line to provide more support.

CHALLENGE Invite students to use rounding to estimate the sum of these numbers (or the sums of just a few of these numbers) and use rounding to estimate the differences between pairs of these numbers. Invite them to calculate those exact sums and differences as well to see how close their estimates were.

2 Display the completed Round & Add Teacher Master from Activity 2, and use it to review how the game is played. (See Activity 2, step 4 for a summary of the game instructions.)

3 Then explain that instead of playing against you, students will play in pairs today.

4 Have students get what they need and then give them time to play the game.

Each pair will need:

- 1 die marked 1–6
- 1 die marked 4–9
- the Round & Add page in one partner's Number Corner Student Book (they can use the other partner's page to play again if they finish early)
- 2 colored pencils, each in a different color
- a calculator for finding the exact sums (optional)

5 Give students time to play. While they do, circulate to observe, answer questions, and differentiate instruction as needed.

SUPPORT Play with a small group of students who need support. You could group them into two teams and provide support, while also encouraging them to work together and help one another.

6 When students have finished playing the game, wrap up today's workout by asking them how they might use rounding in general. Elicit ideas such as estimating and checking to see whether answers are reasonable.

Day 14

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Activity 3 – Reviewing Multiplication Concepts & Arrays (pg. 12)	*Update*	
Number Line	**Solving Problems**	**Assessment**

Activity 3

Reviewing Multiplication Concepts & Arrays — Day 14

1 Open today's activity by letting students know they will work on a Number Corner Student Book page that reflects the big ideas they have been working on this month.

2 Display your copy of the Rectangular Arrays page from the Number Corner Student Book. Give students a moment to look over the page.

3 Read the directions from the items 1, 2, and 3 aloud. Ask students if they have any questions about what to do. Then, have them get started.

4 As students work, circulate around the room to observe, answer questions, and provide differentiated instruction.

ELL Help ELL students understand the directions. Work through 1a with students so they know how to complete 1b. Review any important vocabulary that may have been challenging.

SUPPORT Identify students who have struggled this month to find the area of arrays or who need more help understanding how the area model illustrates basic properties of multiplication. Work with these students in a small group. You may want to show students where repeated addition occurs on an arrays (adding the number of units in each row or column) and build up to multiplying the dimensions or factors.

CHALLENGE Give students a few Small Number Charts. Have them position a 7-by-6 array in different places on the charts. How can the positioning make it easier or harder to determine the area of a 7-by-6 array? Help students use the heavy grid lines to divide the array into smaller arrays that make it easier to compute the area. If students already know the product of 7 and 6, encourage them to work with a combination they don't know already.

5 After most students have finished the Number Corner Student Book page, invite students to share their work.

- Briefly go over 1a and 1b.
- Spend a little more time on item 3. Invite a few students to explain how they found the area of the 7-by-6 array.

6 Wrap up today's activity by spending as much time as you can posting all remaining markers for the month and inviting students to investigate the patterns among them.

Because November is a shorter month of school and this pattern is so layered, students will certainly enjoy having the markers displayed for a few days so that they can ruminate about the patterns. If you have time, revisit the calendar a couple more times before break to invite students to discuss any new patterns they notice.

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Day 15

Date:

Calendar Grid	Calendar Collector	Computational Fluency
Update	*Update*	**Activity 2 –** Playing Array Race (pg. 24)
Number Line	**Solving Problems**	**Assessment**

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Grid is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

- Post one or more calendar markers so that the Calendar Grid is complete up to the current date.
- Update the Calendar Grid Observations Chart.

Key Questions

Use the following questions to guide students' discussion this month:

- What do you notice about the markers?
- How do the markers connect or relate to each other? For example, look at markers 2 and 3. Is there a relationship between them? [The area of marker 3 is twice as big as the area of marker 2, or the height of marker 2 is half the height of marker 3.]
- When do you think we'll see another array that's a square? What do you think its total area might be? How can you tell?
- When will we have another array with a height of 3? What would its area be? How do you know?
- Will there be another array with a height of 4? If so, when? How do you know?
- Set out the markers in rows of 4, and ask students to share what they notice.
- Set out the square arrays in order, and ask students to share what they notice.

Literature Connections

These would be good books to share with your students this month:

- *One Hundred Hungry Ants* by Elinor J. Pinczes
- *Hershey's Milk Chocolate Multiplication Book* by Jerry Pallotta

Update

Starting after Activity 1, have the student helper(s) complete this update procedure every day that the Calendar Collector is not a featured activity. You'll complete this update procedure together as a class as part of Activities 2 and 3.

Procedure

The student helper:

- Spins the spinners and records the results on the record sheet.
- Collects the specified number and kind of unit fraction pieces.
- Glues the pieces to the appropriate number line and labels the number line.

Activity 2

Playing Array Race — Day 15

1 Open today's activity by displaying the Introducing Array Race Teacher Master from Activity 1 and reviewing how the game is played.

- Give students a moment to look it over to refresh their memories of the game.
- Then, invite students to turn to a partner to summarize the directions.
- Invite a pair to explain the directions. If they are missing any information, invite other students to add on. (If necessary, review step 2 from Activity 1 or play a sample round with the class.)

2 Explain that students will play Array Race with a partner today, and ask if they have any questions.

3 Give students time to get what they need and then play in pairs.

- Have students find a partner. (You can also assign partners.)
- Ask them to turn to the Array Race page in their Number Corner Student Books.
- Make sure each pair has two colored pencils in different colors, a 1–6 die, and a 4–9 die.

4 As students play, circulate around the room to make observations, answer questions, and differentiate instruction using the adaptations suggested here.

ELL Help ELL students understand the directions by playing a round with them. Encourage them to ask questions. Invite students to speak in their native languages as they play, if possible.

SUPPORT If students are struggling with their facts, they can play with two 1–6 dice. When they are more solid with these facts, they can begin playing with a 4–9 die. Look for students who are counting squares to determine products. Help them find more efficient strategies, such as repeated addition or skip-counting. The rows and columns lend themselves well to these two strategies.

CHALLENGE Students can play with two 4–9 dice. Alternatively, they can restructure the game to make it more interesting. Include a more strategic element by encouraging students to see how much of one array they can fill in 5 turns. Whoever fills more of the array wins. If the array does not fit, the student loses that turn. This adaptation encourages students to think strategically about placing their arrays. Students may also come up with other game variations.

5 Toward the end of the activity, have students stop playing and put away their materials, and then invite them to reflect on the game.

- Did it help with their facts?
- Was the array useful? Why or why not?

Note

If you have extra days in November, you may want to have students play Array Race again. This game can also be played if ever you have some extra time and students need work with multiplication facts.